Claims:

1. A method for determining a sequence of one or more nucleotides in a target polynucleotide, the method comprising:

(a) contacting a target-specific primer with a polynucleotide sample under conditions effective for the primer to anneal specifically to a primer-complementary region in one or more target polynucleotides, to form one or more target-primer hybrid(s), wherein each target-specific primer contains (i) a target binding segment and (ii) a mobility-reducing moiety which does not bind the target,

(b) reacting said hybrid(s) with a primer extension reagent in the presence of at least one labeled 3'-nucleotide terminator complementary to a selected nucleotide base-type, under conditions effective to form one or more primer extension products which terminate with at least one labeled 3'-nucleotide terminator,

separating electrophoretically the primer extension product(s) under denaturing conditions in a sieving matrix such that smaller extension products migrate more rapidly than larger extension products, and

determining a target sequence on the basis of the mobilities and terminator labels of the separated extension product(s).

2. The method of claim 1, wherein primer extension is performed in the presence of at least one extendable nucleoside monomer under conditions effective to extend specifically hybridized primers by addition of target-complementary polynucleotide monomers and terminator(s), to form said one or more extension products.

3. The method of claim 1, wherein primer extension is performed in the absence of extendable nucleoside monomers, under

conditions effective to append the at least one labeled 3-nucleotide terminator to at least one specifically annealed primer only when the terminator is complementary to a base in the target polynucleotide that is immediately adjacent the extendable end of the annealed primer.

4. The method of claim 1, wherein at least one 3'-nucleotide terminator contains a fluorescent label.

5. The method of claim 4, wherein said reacting is conducted in the presence of four different 3'-nucleotide terminators which (i) are each complementary to a different nucleotide base-type and (ii) each contain a distinguishable fluorescent label that identifies the base-type of the terminator.

6. The method of claim 1, wherein said separating is performed by slab gel electrophoresis.

7. The method of claim 1, wherein said separating is performed by capillary electrophoresis.

8. The method of claim 1, wherein said separating is performed in a microchannel.

9. The method of claim 1, wherein at least one 3'-nucleotide terminator contains a radioactive label.

10. The method of claim 1, wherein said mobility-reducing moiety comprises a polymer segment that does not substantially bind to the target polynucleotide(s).

11. The method of claim 10, wherein said polymer segment comprises a polynucleotide segment that does not substantially bind to the target polynucleotide(s).

12. The method of claim 1, wherein said mobility-reducing moiety is effective to decrease the mobility rate of each primer extension product in an amount equivalent to at least 10 additional nucleotide bases, relative to the mobility of a corresponding primer extension product lacking the mobility-reducing moiety.

13. The method of claim 12, wherein the amount of said decrease in mobility is equivalent to the addition of at least 15 additional nucleotide bases.

14. The method of claim 13, wherein the amount of said decrease in mobility is equivalent to the addition of at least 20 additional nucleotide bases.